

AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:	CA18/2/3/9830	
Aircraft Registration	ZS-OFP	Date of Accident	20 October 2019		Time of Accident	0808Z
Type of Aircraft	Cessna 402 B		Type of Operation	Commercial (Part135)		
Pilot-in-command Licence Type	Commercial Pilot Licence		Age	29	Licence Valid	Yes
Pilot-in-command Flying Experience	Total Flying Hours	706.6		Hours on Type	245.3	
Last Point of Departure	Rand Aerodrome (FAGM), Gauteng Province					
Next Point of Intended Landing	Ant's Nest Private Airfield, Limpopo Province					
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)						
A private airfield at a farm 8NM south-east of Ant's Nest, GPS: 24°12'23.0" S; 028°05'51.0" E, elevation: 3814 feet.						
Meteorological Information	Wind velocity: 260°/02 kt; Visibility: 10km; Cloud: Nil; Visibility: 10km; Temperature: 24°C; Dew Point:06°; QNH:1019					
Number of people On-board	1 + 5	No. of People Injured	0	No. of People Killed	0	
Synopsis	<p>On 20 October 2019, the aircraft with registration marks ZS-OFP took off at 0715Z with the pilot and five passengers on-board from the Rand Aerodrome (FAGM) in Gauteng Province to Ant's Nest private airfield in Limpopo Province. This was a charter flight operated under the provision of Part 135 of the Civil Aviation Regulations (CAR) 2011 as amended. The operation was carried out using instrument flight rules (IFR) by day. The pilot-in-command (PIC) reported that they had conducted two fly passes over the private airfield to inspect the runway before joining the circuit. The fly passes did not reveal any concerns about the grassy runway. At approximately 0800Z, the aircraft was configured for approach for landing on Runway (RWY) 04. During landing on a grassy and uneven runway surface, the right-hand side main landing gear collapsed. Subsequently, the right-hand side engine propeller and the wing made contact with the ground. The aircraft veered off to the right of RWY 04 where it came to rest on the side. None of the occupants were injured during the accident; they all disembarked the aircraft unassisted.</p> <p>The aircraft was recovered post the accident where the landing gear was secured. The aircraft was towed to the hangar at Ant's Nest private airfield. The aircraft's right main gear, propeller and wing were damaged during the accident.</p> <p>The investigation revealed that the aircraft landed on an unused and uneven airstrip and, during the landing roll, the right-hand main landing gear got into a ditch and collapsed, causing the aircraft to veer off to the right of the private airfield. The collapse of the right-hand main landing gear was because of the sheared off end fitting of the main gear retracting linkage.</p>					
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Reference Number : CA18/2/3/9830
Name of Owner/Operator : MCC Aviation
Manufacturer : Cessna Aircraft
Model : C402B
Nationality : South African
Registration Marks : ZS-OFP
Place : 8 NM south-east of Ant's Nest, Limpopo Province
Date : 20 October 2019
Time : 0808Z

All times given in this report are Co-ordinated Universal Time (UTC) and will be denoted by (Z). South African Standard Time is UTC plus 2 hours.

Purpose of the Investigation:

*In terms of Regulation 12.03.1 of the Civil Aviation Regulations (CAR) 2011, this report was compiled in the interest of the promotion of aviation safety and the reduction of the risk of aviation accidents or incidents and **not to apportion blame or liability**.*

Investigations process:

The accident was notified to the Accident and Incident Investigations Division (AIID) on 21 October 2019 at approximately 1200Z. The investigator/s dispatched to Ant's Nest Lodge, Vaalwater, on 28 November 2019. The investigator/s co-ordinated with all authorities on site by initiating the accident investigation process according to CAR Part 12 and investigation procedures. The AIID is leading the investigation as the Republic of South Africa is the State of Occurrence.

Notes:

1. Whenever the following words are mentioned in this report, they shall mean the following:

- Accident – this investigated accident*
- Aircraft – the Cessna 402B involved in this accident*
- Investigation – the investigation into the circumstances of this accident*
- Pilot – the pilot involved in this accident*
- Report – this accident report*

2. Photos and figures used in this report were taken from different sources and may be adjusted from the original for the sole purpose of improving clarity of the report. Modifications to images used in this report were limited to cropping, magnification, file compression; or enhancement of colour, brightness, contrast; or addition of text boxes, arrows or lines.

Disclaimer:

This report is produced without prejudice to the rights of the South African Civil Aviation Authority (SACAA), which are reserved.

1. FACTUAL INFORMATION

1.1. History of Flight

- 1.1.1 On 20 October 2019 at approximately 0715Z, a Cessna C402B aircraft took off from the Rand Airport (FAGM) to Ant's Nest Lodge with the pilot and five passengers on-board. The aircraft was operated commercially as a charter flight under instrument flight rules (IFR) by day and conducted under the provisions of Part 135 of the Civil Aviation Regulations (CAR) 2011 as amended.
- 1.1.2 The pilot reported that she conducted two fly passes over the private farm airfield's grassy runway to inspect it before joining the circuit for landing on Runway (RWY 04). The fly passes did not reveal any concerns on the grassy runway, and the pilot elected to use RWY 04.
- 1.1.3 At approximately 0800Z, the aircraft was established on approach to land on RWY 04. During landing on an uneven grassy runway, the right-hand side main landing gear collapsed. Subsequently, the right-hand side engine propeller and wing made contact with the ground.
- 1.1.4 The aircraft veered off to the right of RWY04 where it came to rest. None of the occupants were injured during the accident sequence; they disembarked the aircraft unassisted. The aircraft was recovered post the accident where the landing gear was secured.
- 1.1.5 According to the owner of Ant's Nest Lodge, the aircraft landed at an unused private airfield located 8 nautical miles (nm) or 15 kilometres (km) south-east of Ant's Nest Lodge. Ant's Nest Lodge's Global Positioning Systems (GPS) co-ordinates and runway dimensions are provided on their website.
- 1.1.6 The operator reported that neither Ant's Nest Lodge nor the witness "who is a service provider" communicated GPS co-ordinates in writing. The instructions were to fly to Ant's Nest Lodge.
- 1.1.7 The operator reported that they relied on the Airfields Directory for GPS co-ordinates because neither Ant's Nest Lodge nor the service provider provided any other instructions except that the flight must be planned for Ant's Nest Lodge. The pilot had previously flown to Ant's Nest Lodge on the same aircraft.
- 1.1.8 The GPS co-ordinates for Ants Nest Lodge were obtained from the Airfields Directory and were confirmed with the GPS co-ordinates pre-loaded on the aircraft. The Ant's Nest Lodge owner confirmed that the private airfield was still used frequently until May 2019.
- 1.1.9 The witness who is the service provider, reported that despite having flown to the correct airfield previously, on the day of the accident, the pilot had planned incorrectly, and they landed on a private farm airfield that had not been used or maintained in more than two years.
- 1.1.10 The witness further reported that after the accident, the operator sent for a helicopter, ZS-RMM, to have the clients collected from the accident site to the correct private airfield where the Ant's Nest Lodge staff would receive them. However, after collecting the clients, the helicopter pilot got lost for about 2 hours in the reserve, but finally landed at a police station where the clients telephoned Ant's Nest Lodge to request to be collected from the police station.
- 1.1.11 The aircraft maintenance engineer (AME) who conducted the post-flight inspection revealed that the right-hand main landing gear collapsed because of the sheared off end fitting of the main gear retracting linkage.

1.1.12 The aircraft accident occurred at an unused private airfield during daylight in visual meteorological condition (VMC) by day at Global Positioning System (GPS) determined to be 24°12'23.0" S; 028°05' and at a field elevation of 3805 feet (ft) above mean sea level (AMSL).

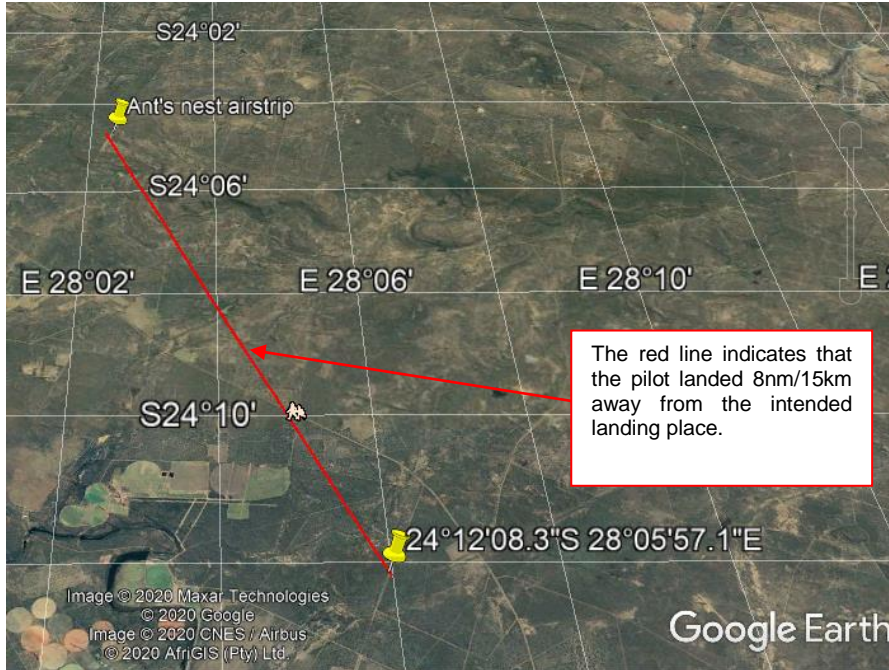


Figure 1: Distance between the active Ant’s Nest Lodge private airfield and the aircraft’s actual landing.

1.2. Injuries to Persons

Injuries	Pilot	Crew	Pass.	Other
Fatal	-	-	-	-
Serious	-	-	-	-
Minor	-	-	-	-
None	1	-	5	-

1.3. Damage to Aircraft

1.3.1 The aircraft sustained minor damage to the right engine propeller, right main landing gear door and the bottom of the right wing during the accident sequence.



Figure 2: Damaged aircraft's right wing.



Figure 3: The aircraft as it came to rest after the accident.

1.4. Other Damage

1.4.1 None.

1.5. Personnel Information

Nationality	South African	Gender	Female	Age	29
Licence Number	0272320141	Licence Type	Commercial Pilot Licence		
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	Instrument and Night				
Medical Expiry Date	28 February 2020				
Restrictions	Corrective Lenses				
Previous Accidents	None				

Flying Experience:

Total Hours	706.6
Total Past 90 Days	118.5
Total on Type Past 90 Days	52.9
Total on Type	245.3

1.6. Aircraft Information**Airframe:**

Type	C402B	
Serial Number	402B-1046	
Manufacturer	Cessna Aircraft Company	
Date of Manufacture	1974	
Total Airframe Hours (At time of Accident)	9378.8	
Last MPI (Date & Hours)	25 July 2019	9289.6
Hours since Last MPI	89.2	
C of A (Issue Date)	20 November 1998	
C of R (Issue Date) (Present owner)	04 July 2011	
Operating Categories	Standard Normal Category (Aeroplane)	

1.6.1 The Mandatory Periodic Inspection (MPI) carried out on 25 July 2019 included the inspection of the landing gear system which was found to be serviceable.

Engine No 1:

Type	Continental
Serial Number	815211-R
Hours Since New	1480.8
Hours Since Overhaul	93.3

Engine No 2:

Type	Continental
Serial Number	815175-R
Hours Since New	2235.8
Hours Since Overhaul	853.3

Propeller No 1:

Type	McCauley
Serial Number	781998
Hours Since New	1193.4
Hours Since Overhaul	872.2

Propeller No 2:

Type	McCauley
Serial Number	733017
Hours Since New	964.4
Hours Since Overhaul	643.2

1.7. Meteorological Information

1.7.1 The weather information was sourced from the South African Weather Service (SAWS) for 20 October 2019 at 0500Z.

Wind direction	260°	Wind speed	02 kt	Visibility	10 km
Temperature	24°C	Cloud cover	Nil	Cloud base	Nil
Dew point	06°C	QNH	1019		

1.8. Aids to Navigation

1.8.1 The aircraft was equipped with standard navigational equipment as approved by the Regulator (SACAA) for the aircraft type. There was no record indicating that the navigation system was unserviceable prior to the accident.

1.9. Communication

1.9.1 The aircraft was equipped with standard communication equipment as approved by the Regulator for the aircraft type. There was no record indicating that the communication system was unserviceable prior to the accident.

1.10. Aerodrome Information

1.10.1 The occurrence took place at an unused grassy private airfield on a private farm 8nm or 15km south-east of Ant's Nest Lodge private airfield with GPS co-ordinates 24°04'52.26" S 028°02'18.6 E. Ant's Nest Lodge private airfield (Limpopo province) GPS co-ordinates are 24°12'23.0" S; 028°05'51.0" E, at an elevation of 3937ft AMSL. Information for both private strips is provided below:

Aerodrome Location	Private Farm Airfield (Limpopo Province)
Aerodrome Co-ordinates	24°04'52.26" S 028°02'18.6 E
Aerodrome Elevation	Unknown
Runway Designations	04/22
Runway Dimensions	1000m x 15m
Runway Used	RWY04
Runway Surface	Grass surface
Approach Facilities	None

Details for Ants Nest:

Aerodrome Location	Ant's Nest Private Airfield (Limpopo Province)
Aerodrome Co-ordinates	24°12'23.0" S; 028°05'51.0" E
Aerodrome Elevation	3814 ft (AMSL)
Runway Designations	03/21
Runway Dimensions	1200
Runway Used	None.
Runway Surface	Gravel surface
Approach Facilities	None

1.11. Flight Recorders

1.11.1 The aircraft was not equipped with a flight data recorder (FDR) nor a cockpit voice recorder (CVR), and neither recorder was required by regulation.

1.12 Wreckage and Impact Information

1.12.1 The aircraft accident occurred on a grassy runway during the landing phase. According to the pilot, the runway surface was unsuitable because it (surface) was uneven and soft. The aircraft came to rest on the right-hand side of RWY 04 with a collapsed right-hand main landing gear and damaged propeller. After recovery, it was noted that the aircraft sustained minor damage to the right engine propeller, right main landing gear door, right wing, as well as had a sheared main landing gear retracting linkage connecting bolt.



Figure 4: The view of the aircraft at rest at the accident site.



Figure 5: A close-up view of the aircraft at rest at the accident site.



Figure 6: View of the damaged propeller following the collapse of the right-hand main landing gear.

1.13 Medical and Pathological Information

1.13.1 None.

1.14 Fire

1.14.1 There was no evidence of a pre- or post-impact fire.

1.15 Survival Aspects

1.15.1 The accident was considered survivable as the cockpit structure had no damage which could have caused serious injuries to the pilot and passengers.

1.16 Tests and Research

1.16.1 None.

1.17 Organisational and Management Information

1.17.1 The aircraft maintenance organisation (AMO) was issued an approval certificate on 7 January 2019 with an expiry date of 31 December 2019.

1.17.2 The operator was issued an Air Operating Certificate (AOC) No. CAA/N751D on 18 April 2019 with an expiry date of 31 October 2019.

1.17.3 The operator was issued an Air Service Licence No N751D on 19 September 2007.

1.18 Additional Information

1.18.1 The following information was sourced from Cessna Aircraft Company, aircraft maintenance service manual for Model 401/402:

The main landing gear actuator is classified under E as an on-condition item for overhaul/replacement purposes. The main landing gear actuator is checked for conditions, operation and security during 50 hours and 12 months maintenance inspections.

According to the reviewed documentations, there were no recorded or reported defects or faults prior to the flight and/or the accident. There were no records that the actuator was ever replaced since new. It is likely that the failure was a result of the main landing gear getting into a ditch.

1.19 Useful or Effective Investigation Techniques

1.19.1 None.

2. ANALYSIS

2.1. General

From the evidence available, the following analysis was made with respect to this accident. These shall not be read as apportioning blame or liability to any particular organisation or individual.

2.2. Analysis

2.2.1 According to available records, the aircraft's last Mandatory Periodic Inspection (MPI) was carried out on 25 July 2019 at 9289.6 airframe hours, which included the inspection of the main landing gears. The aircraft had accumulated a total of 9378.8 airframe hours at the time of the accident and had flown 89.2 hours after its MPI.

2.2.2 The main landing gear actuator (that had failed) was checked for conditions, operation and security at 50 hours and at 100 hours MPI. The maintenance documents reviewed indicated that there were no recorded or reported faults prior to the flight and/or the accident. There were no records of the actuator change or of its replacement since new. It is likely that the failure was a result of the main landing gear getting into a ditch during landing.

2.2.3 The aircraft was initially issued a certificate of airworthiness on 20 November 1998 and was reissued on 1 November 2018 with an expiry date of 30 November 2019. The aircraft was issued a certificate of registration on 4 July 2011.

- 2.2.4 The flight was conducted using instrument flight rules (IFR) by day in VMC. The weather at the time of the accident was: Wind 260°02kts, Temperature 24°C, Dew point 06°C, QNH 1019hPa, and ceiling and visibility ok (CAVOK). The weather did not contribute to the accident.
- 2.2.5 The pilot was issued a Commercial Pilot Licence (CPL) on 23 January 2019 with an expiry date of 31 January 2020. Her last skills test was conducted on 23 January 2019.
- 2.2.6 The pilot was issued a Class 1 medical certificate on 27 February 2019 with an expiry date of 28 February 2020.
- 2.2.7 The pilot landed the aircraft at an unused grassy private strip 8nm or 15km south-east of Ant's Nest Lodge. The operator received an instruction to conduct a flight to Ant's Nest Lodge. The flight was planned for the private farm airfield according to the information in the Airfields Directory.
- 2.2.8 The witness who is the service provider, reported that despite the pilot having flown to the correct airfield at Ant's Nest airfield in the past, on the day of the accident, the pilot had planned incorrectly and, as a result, landed the aircraft at the private farm airfield which had not been used in more than two years. The witness further reported that after the accident, the operator sent for a helicopter, ZS-RMM, to collect the clients from the accident site to transport them to the correct airfield where Ant's Nest Lodge staff would receive them.
- 2.2.9 The investigation revealed that the aircraft landed on an unused and uneven private airfield and, during the landing roll, the right-hand main landing gear got into a ditch and collapsed, causing the aircraft to veer off to the right of the private airfield. The right-hand main landing gear collapsed because of the sheared off end fitting of the main gear retracting linkage.

3. CONCLUSION

3.1. General

From the available evidence, the following findings, causes and contributing factors were made with respect to this accident. These shall not be read as apportioning blame or liability to any particular organisation or individual.

To serve the objective of this investigation, the following sections are included in the conclusions heading:

- **Findings** — are statements of all significant conditions, events or circumstances in this accident. The findings are significant steps in this accident sequence, but they are not always causal or indicate deficiencies.
- **Causes** — are actions, omissions, events, conditions, or a combination thereof, which led to this accident.
- **Contributing factors** — are actions, omissions, events, conditions, or a combination thereof, which, if eliminated, avoided or absent, would have reduced the probability of the accident or incident occurring, or mitigated the severity of the consequences of the accident or incident. The identification of contributing factors does not imply the assignment of fault or the determination of administrative, civil or criminal liability.

3.2. Findings

- 3.2.1 The pilot was issued a Commercial Pilot Licence (CPL) on 23 January 2019 with an expiry date of 31 January 2020. Her last skills test was conducted on 23 January 2019.
- 3.2.2 The pilot was issued a Class 1 medical certificate on 27 February 2019 with an expiry date of 28 February 2020.

- 3.2.3 The aircraft was initially issued a certificate of airworthiness (CoA) on 20 November 1998. The latest CoA was reissued on 20 November 2018 with an expiry date of 30 November 2019.
- 3.2.4 The aircraft was issued a certificate of registration (CoR) on 4 July 2011.
- 3.2.5 The aircraft's last MPI was carried out on 25 July 2019 at 9289.6 airframe hours. The aircraft had flown a further 89.2 hours since its last MPI.
- 3.2.6 The main landing gear actuator that had failed was checked for conditions, operation and security at 50 hours and at 100 hours MPI. The maintenance documents reviewed indicated that there were no recorded or reported faults prior to the flight and/or the accident. There were no records of the actuator change or its replacement since new. It is likely that the failure was a result of the main landing gear getting into a ditch during landing.
- 3.2.7 The flight was conducted under IFR by day. The weather at the time of the accident was: Wind 260°02kts, Temperature 24°C, Dew point 06°C, QNH 1019hPa, and CAVOK. The weather did not contribute to the accident.
- 3.2.8 The operator received an instruction to conduct a flight to Ant's Nest Lodge. The flight was planned for Ant's Nest private airfield according to the information in the Airfields Directory. The operator reported that the private airfield was not marked with crosses to show the runway designations.
- 3.2.9 The witness who is the service provider, reported that despite having flown to the correct private airfield at Ant's Nest Lodge previously, on the day of the accident, the pilot had planned incorrectly and, therefore, landed on an old private airfield which had not been used in more than two years. The witness further reported that after the accident, the operator sent for a helicopter, ZS-RMM, to collect the clients from the accident site to the correct private airfield where Ant's Nest Lodge staff would receive them. After collecting the clients, the helicopter pilot got lost for about 2 hours in the reserve, but finally landed at a police station where the clients telephoned Ant's Nest Lodge to request to be collected from the police station. From the above two statements, it is clear that it was a norm for the operator not to plan their flights properly.
- 3.2.10 The investigation revealed that the aircraft landed on an unused and uneven airstrip and, during the landing roll, the right-hand main landing gear got into a ditch and collapsed, causing the aircraft to veer off to the right of the private airfield. The collapse of the right-hand main landing gear was because of the sheared off end fitting of the main gear retracting linkage.

3.3. Probable Cause/s

- 3.3.1 The aircraft landed on an unused and uneven airstrip and, during the landing roll, the right-hand main landing gear got into a ditch and collapsed, causing the aircraft to veer off to the right of the private airfield. The collapse of the right-hand main landing gear was because of the sheared off end fitting of the main gear retracting linkage.

3.4. Contributory Factors:

- 3.4.1 The crew did not properly plan their flight to the destination airfield.

4. SAFETY RECOMMENDATIONS

4.1. General

The safety recommendations listed in this report are proposed according to paragraph 6.8 of Annex 13 to the Convention on International Civil Aviation and are based on the conclusions listed in heading 3 of this report; the AIID expects that all safety issues identified by the investigation are addressed by the receiving States and organisation.

4.2. Safety Recommendation/s

4.2.1 Safety message: Pilots should ensure that they plan their flight taking into consideration the condition of the destination airfield and its co-ordinates.

5. APPENDICES

5.1 None.

This Report is issued by:

**Accident and Incident Investigations Division
South African Civil Aviation Authority
Republic of South Africa**